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# Analysis of industrial areas of Ekaterinburg

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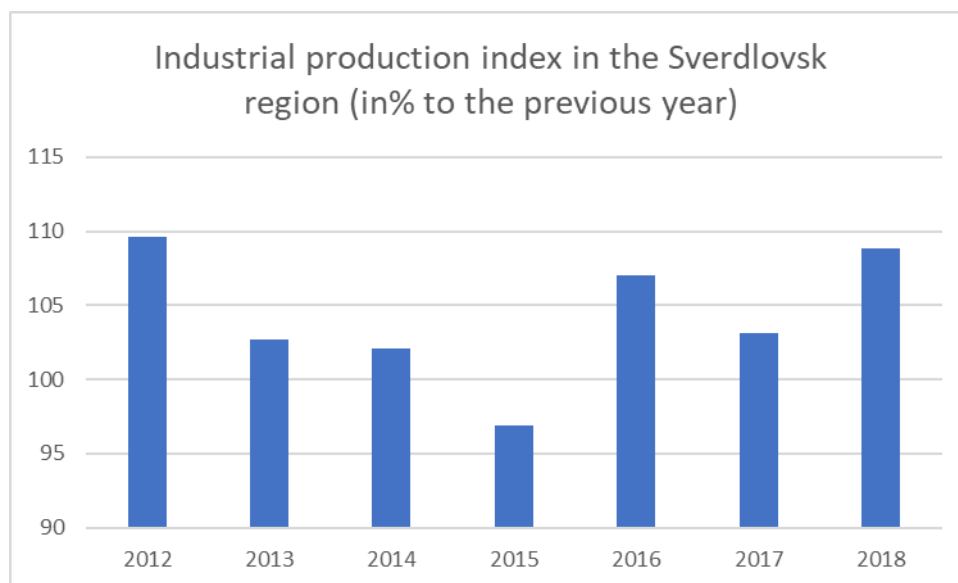
**Abstract.** The article views the relationship between the change in the purpose of the industrial area and the planning structure of the city. Moreover it includes the proposed gradation of enterprises depending on the area of their industrial sites. Also the text point out the uniqueness of the industrial site of PJSC "Uralsmashzavod" among other enterprises of the heavy industry of the city of Ekaterinburg.

## 1. Introduction

At present, the progressive growth of the Sverdlovsk region continues; it combines industrial, social, cultural, educational, scientific and managerial functions. Old-developed city-factories, such as Ekaterinburg, today bring developed trade and social, cultural and management options into their structure. Nevertheless, industry still has a decisive influence on the economic component of cities.

According to the investment portal of the Sverdlovsk region in 2018, the growth of profits of large industrial enterprises amounted to 41.9% compared with 2017 (Pic. 1). The largest growth in production has been in the engineering sector: the production of machinery and equipment has been 1.5 times higher than the level of January-October 2017, vehicles, trailers and semi-trailers has been 1.3 times; vehicles and equipment has changed by 12.9% [1]. Thus, industrial enterprises provided 41% of investments in the fixed capital of large and medium-sized organizations, which suggests that almost half of the profits in the economy of the Sverdlovsk region are brought by industrial sites. Renovation of industrial areas in order to give the site a different economic function may lead to a loss of production capacity and thereby reduce the economic growth of the region and, consequently, lead to a decline in the economy of the Sverdlovsk region.





**Figure 1.** The index of industrial production in the Sverdlovsk region (in % to the previous year).

## 2. Changes of industrial sites of the city of Ekaterinburg

Despite the fact that production plays a significant role in the development of cities, currently the most popular in Ekaterinburg is the territory redevelopment. Redevelopment is the transfer of an industrial enterprise outside the city limits, and there are a public and residential building on the vacated area. Examples include the residential complex "Universitetsky", built on the site of the Uralobuv Plant, the Malevich residential complex, the Makarovskiy Quarter residential complex on the site of the Ekaterinburg Flour Mill. A similar fate awaits the factory of V.V. Vorovskogo, Zavokzalny district, the territory of the former JSC "Uraltransmash" and there is a discussion of a partial change of the territory of PJSC "Uralmashzavod". This method has a number of advantages and disadvantages that affect the urban planning and economic components of the city. Positive and negative points of redevelopment is presented in Table 1 below.

**Table 1.** advantages and negative points of redevelopment

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Ability to create a new architectural image of the city;</li> <li>• Improving city planning;</li> <li>• Getting the economic benefits in the sale or rental of the premises (apartments) newly constructed buildings;</li> <li>• Elimination of sanitary protection zones, allowing the development of adjacent territories;[4]</li> <li>• Increasing environmental areas</li> </ul>	<ul style="list-style-type: none"> <li>• Violation of existing transport links and the need to build new one;</li> <li>• Overload of existing engineering networks, the need for building new sets;</li> <li>• Loss of jobs in the city;</li> <li>• Creation of additional transport traffic when moving "housing-work"</li> </ul>

The pros and cons that arising from a change in the purpose of the industrial site confirm the need for a serious study of project of this type and its impact on the development plan of the city as a whole. The lack of consistency and complementarity of the building, as well as the hasty and ill-conceived disbanding of industry, can lead the city to the loss of existing advantages and a serious lag in development from competitors [2].

### 3. Analysis of industrial sites

Due to the fact that in the city of Ekaterinburg there is an active redevelopment of territories, the number of production zones decreases. The question arises: how many lands for industrial needs is used for its intended purpose. Since the purpose of the study is PJSC “Uralmashzavod”, the data were collected specifically for machine-building enterprises. Information on the number of engineering plants in the city of Ekaterinburg are taken from the official portal of the city; and the area of territories is determined according to the Public cadastral map.

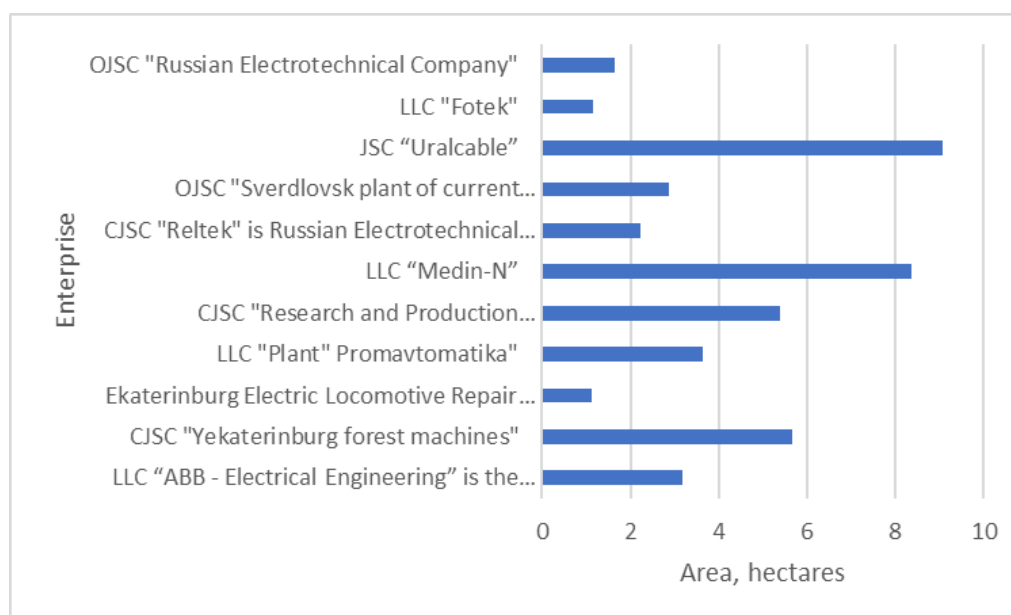
According to official sources, on September 3, 2018 there are about 50 industrial enterprises, which can be divided into 3 groups depending on the area of their industrial zone.

#### 3.1. Enterprises of the first group up to 10 hectares

Basically, these are branches of larger enterprises, or narrowly focused production, such as LLC “ABB - Electrical Engineering” that is the Ural branch of the enterprise (about 35 thousand square meters) or OJSC “Sverdlovsk plant of current transformers” (about 3 hectares). Enterprises of the first group is presented in Table 2 and picture 2 below.

**Table 2.** Enterprises of the first group up to 10 hectares

Enterprise	Area, hectares
LLC “ABB - Electrical Engineering” is the Ural branch of the enterprise	3.17
CJSC “Yekaterinburg forest machines”	5.67
Ekaterinburg Electric Locomotive Repair Plant is a branch of OAO “Zheldorremmash”	1.11
LLC “Plant” Promavtomatika”	3.64
CJSC “Research and Production Association” League-7”	5.38
LLC “Medin-N”	8.36
CJSC “Reltek” is Russian Electrotechnical Company	2.24
OJSC “Sverdlovsk plant of current transformers”	2.86
JSC “Uralcable”	9.07
LLC “Fotek”	1.17
OJSC “Russian Electrotechnical Company”	1.66



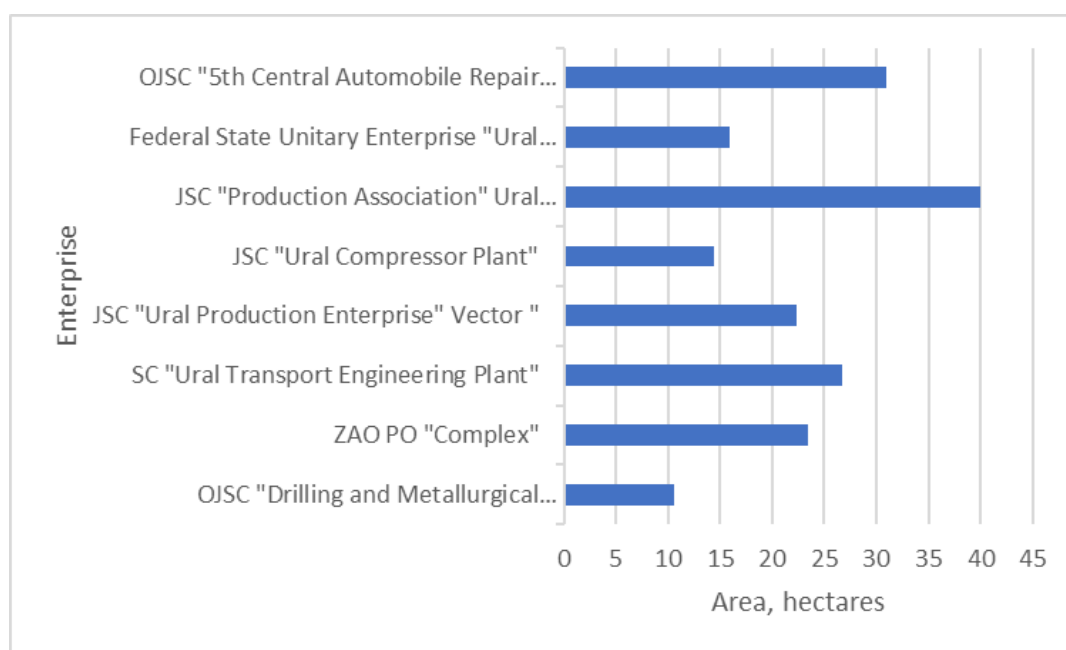
**Figure 2.** Diagram. Enterprises of the first group.

### 3.2. Enterprises of the second group from 10 to 50 hectares

Plants that have a larger turnover of industry than in the factories of the first group. For example, OJSC "Drilling and Metallurgical Equipment Plant" is based on about 11 hectares and JSC "Ural Production Enterprise" Vector " is located on about 23 hectares. Enterprises of the second group is presented in Table 3 and picture 3 below.

**Table 3.** Enterprises of the second group from 10 to 50 hectares

<b>Enterprise</b>	<b>Area, hectares</b>
OJSC "Drilling and Metallurgical Equipment Plant"	10.61
ZAO PO "Complex"	23.39
SC "Ural Transport Engineering Plant"	26.77
JSC "Ural Production Enterprise" Vector "	22.34
JSC "Ural Compressor Plant"	14.38
JSC "Production Association" Ural Optical-Mechanical Plant named after E.S. Yalamova	40.02
Federal State Unitary Enterprise "Ural Electromechanical Plant"	15.91
OJSC "5th Central Automobile Repair Plant"	30.91



**Figure 3.** Diagram. Enterprises of the second group.

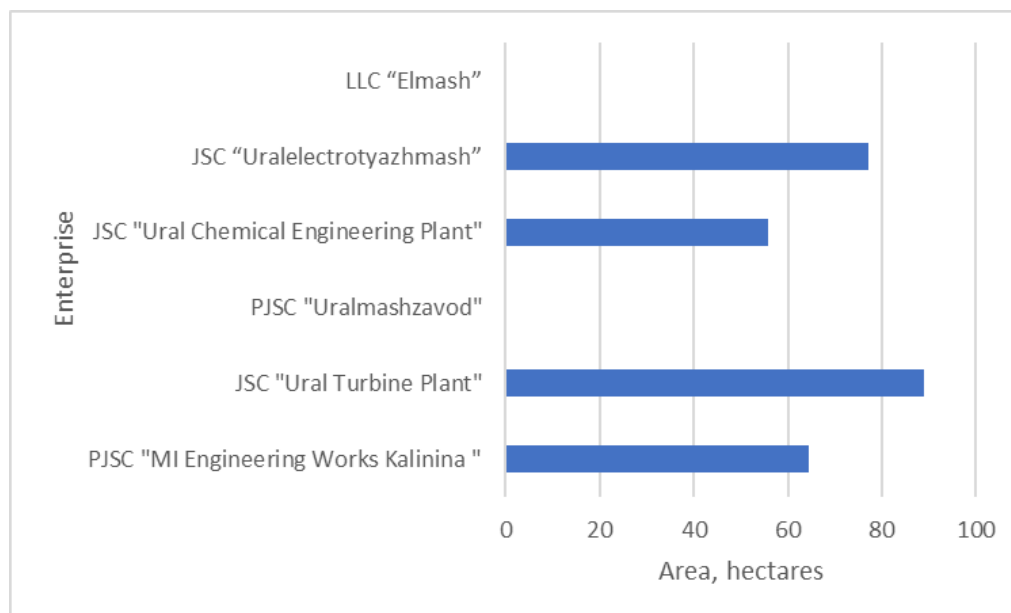
### 3.3. Enterprises of the third group of 50 hectares or more

An example of such enterprises is PJSC "MI Engineering Plant Kalinina "(about 70 hectares) and JSC" Ural Turbine Plant "(about 90 hectares). Enterprises of the third group is presented in Table 4 and picture 4 below.

**Table 3.** Enterprises of the third group of 50 hectares or more

<b>Enterprise</b>	<b>Area, hectares</b>
PJSC "MI Engineering Plant Kalinina "	64.54
JSC "Ural Turbine Plant"	89.04
<b>PJSC "Uralmashzavod"</b>	<b>2 43.94</b>

Enterprise	Area, hectares
JSC "Ural Chemical Engineering Plant"	55.75
JSC "Uralelectrotyazhmash"	77.08
LLC "Elmash"	



**Figure 4.** Diagram. Enterprises of the third group.

Based on the proposed classification, PJSC Uralsmazavod is in the third group, but at the same time it has a significantly larger area than other enterprises — more than 200 hectares. Thus, this area is unique among others in terms of area, but this is not the only advantage of the plant. The company is located in the city, which allows workers to travel by public transport and do not have to use factory buses or private cars. At the same time, competent logistics inside and outside the enterprise has been carried out and tested, which allows the delivery of manufactured mining equipment to the installation site in various places of the country and the world.

The draft master plan of the city assumes the division of the territory of PJSC Uralsmazavod by two highways of urban importance in the north-south direction in order to increase the connectivity of the northern part of the city with the center. At the same time, the division of the industrial-communal area of Zavokzalny concern also occurs. Those changes are due to the need to solve the transport problem on two existing highways, that are Cosmonauts Avenue and Donbasskaya Street. Such a solution to the transportation problem will result in restructuring as a result of the fragmentation of its industrial site [2]. Thus, solving one town-planning issue can give rise to an even more serious economic problem, since industry is one of the key advantages of the city of Ekaterinburg and the Sverdlovsk region as a whole. Following the above, we can conclude that PJSC "Uralsmazavod" is a unique enterprise of the city with a unique industrial territory, the loss of integrity of which will cause the dramatic decrease of not only the existing plant, but will not allow developing heavy engineering in the future, without which it is impossible to imagine positive growth of the economy of the city of Ekaterinburg.

#### 4. Conclusion

The city of Yekaterinburg, as one of the old-developed city-factories, must certainly maintain its industrial potential, the security of which is the industrial territories in its planning structure. It is

necessary to think over the new general plan of the city and calculate all the economic components, so that the residents have the opportunity not only to live in this city, but also to be provided with work, including industrial production, taking into account the development of the economy. Special attention should be paid to the industrial heritage of the city and to preserve the industrial potential of the city of Ekaterinburg.

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